Caden Jiang

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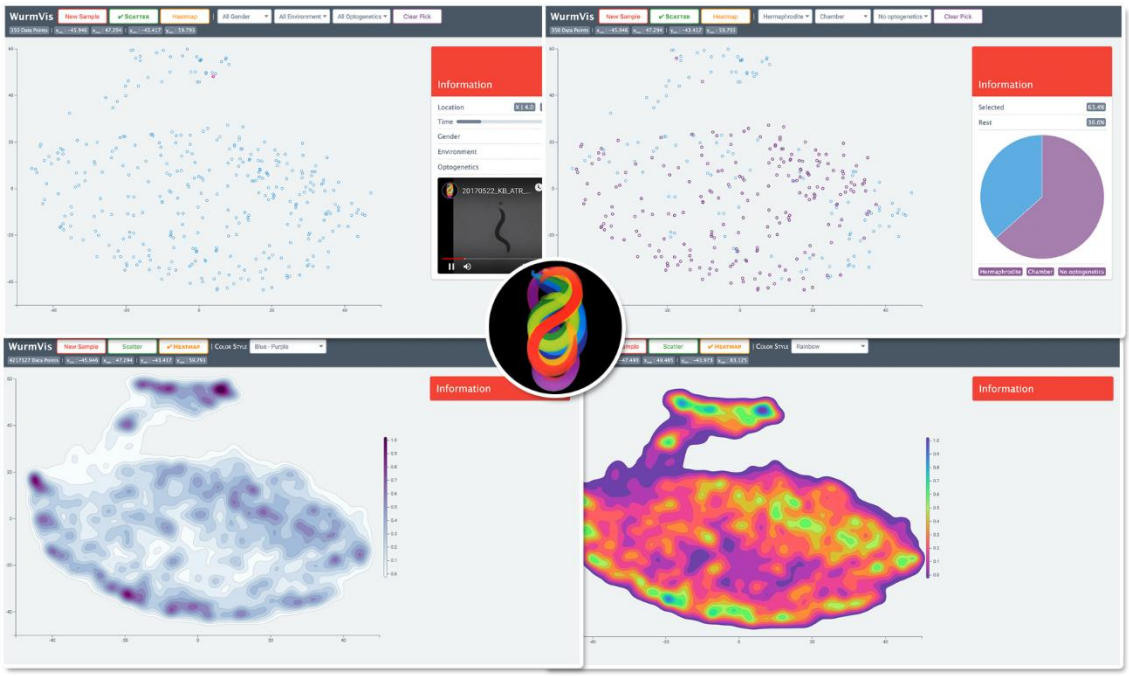
WurmVis

Data Visualization

Lu Fluidics Group (Georgia Institute of Technology) • Aug 2018 – May 2019



This is my second project with Lu Fluidics Group, this time creating a visualization tool for their vast amounts of data collected analyzing the behavior of “c. elegans” round worms (part of the data is collected though my android app “Wurm Paint” described on the next page). The data given are of an intermediary state partially representing embeddings like those in a neural network. Previously, data is stored in Matlab files and then analyzed batch by batch, and the research team is eager to find a faster way of both analyzing and visualizing the data.

With some knowledge in D3.js learnt in class, I created a web app, loading a library of json files into sampled data points on the screen. From there, one can group data based on different attribute combinations. Selecting a single data point also reveals in detail of the worm behavioral instance it is describing, including a linked video snapshot of that time frame. For a bigger picture, I have provided a normalized heatmap view that shows the concentration of data points in a given sample. There are different color scales to choose from for better contrast and presentation.

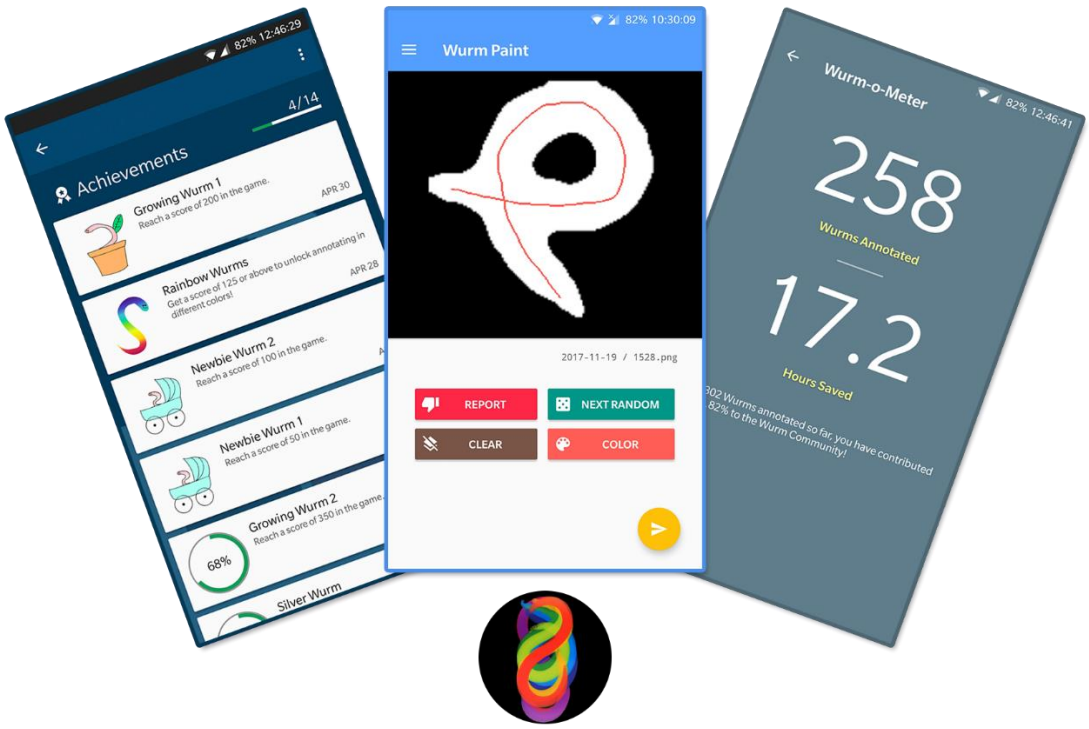
I have learnt while making the project how making a clean and simple interface of displaying and organizing data can speed up its analysis. This project can be extended to many more uses in the future.

https://github.com/jiangshen/WurmVis

Wurm Paint

Research App

Lu Fluidics Group (Georgia Institute of Technology) • Sep 2017 – Jul 2018



Both a scientific app and a game. Wurm Paint started off as a way to efficiently annotate the backbone structure of little “c. elegans” round worms. The data is then used to supply to a model predicting their behaviors for further research. Previously, annotation data gathering is limited to a few members on the research team manually looking at every dataset and using a mouse to trace lines on the screen by hand, before organizing and compiling all the different drawings on Matlab. My android app, Wurm Paint, streamlined this process with a touch screen. Downloading the app is easy and anyone can finish a drawing in seconds, while smooth and intentional transitions direct them to the next one. Behind the scenes, each drawing data is tagged to the worm pictures and automatically organized. With a single click, a researcher can download entire data collection and start analyzing right away.

As I developed the app further, we upgraded the experience into an addicting game now complete with achievements showing cumulative effort and contribution. The app is released to the Google Play store to reach a larger audience, crowdsourcing efforts where anyone can contribute to science research. I also realized the potential to adapt the app for other research projects. Overall, it has been a very fun and fulfilling experience reducing a painstaking problem to something fun and engaging.

https://github.com/jiangshen/WurmPaint

Research Paper: https://www.future-science.com/doi/pdf/10.2144/btn-2019-0010

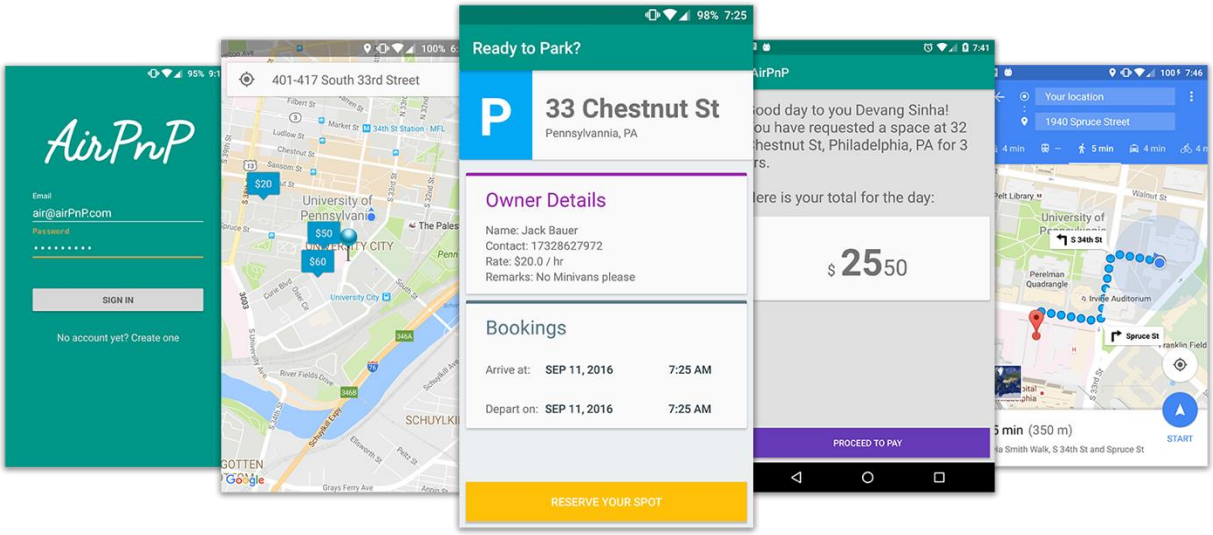
AirPnP

Linode Sponsor Honorable Mention

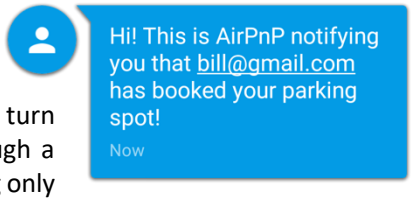
PennApps • Sep 2016

Connecting private parking spaces with desperate drivers.

Have you ever gone on a trip in high spirits only to be stuck at finding parking space at the crowded beach, or are you trying to get to an urgent meeting in a busy city yet failing to find that plot of land to leave your car on? We believe a simple market solution could potentially solve all your problems – through leveraging on crowdsourcing of private parking spaces all around you.



Using our app is akin to hailing a UberX. I designed the layout in such a way that it pulls from a list of available private parking spots near your current location. Once a pin is selected, the user can review more details and proceed to payment. In a simple touch, the transaction is completed. A text message will be sent to the owner notifying him of the booking, while turn by turn directions will be provided to the user for ease of navigation. Through a simple and clean interface, we minimized the number of steps, focusing only on the essentials. A frustrated driver could now find a parking spot in no more than 5 steps, while homeowners have a new way of monetizing their space, saving everyone's time and money.



Beneath the simple interface, my team and I worked hard on the backend to pack all our features into a cohesive package. We used MongoDB as the main database to store our list of users as well as owners. We host the database as well as most of our server code on Linode virtual machines, and for payment we used CapitalOne's Nessie API to facilitate monetary transaction between two users with CapitalOne accounts. Finally the SMS notification employed the Nexmo API for that finishing touch. This project could not have been accomplished without the hard work from my two teammates, along with 24 hours of non-stop coding and troubleshooting. We believe our app has much potential to continue further.

http://devpost.com/software/airpnp-sn7hdb

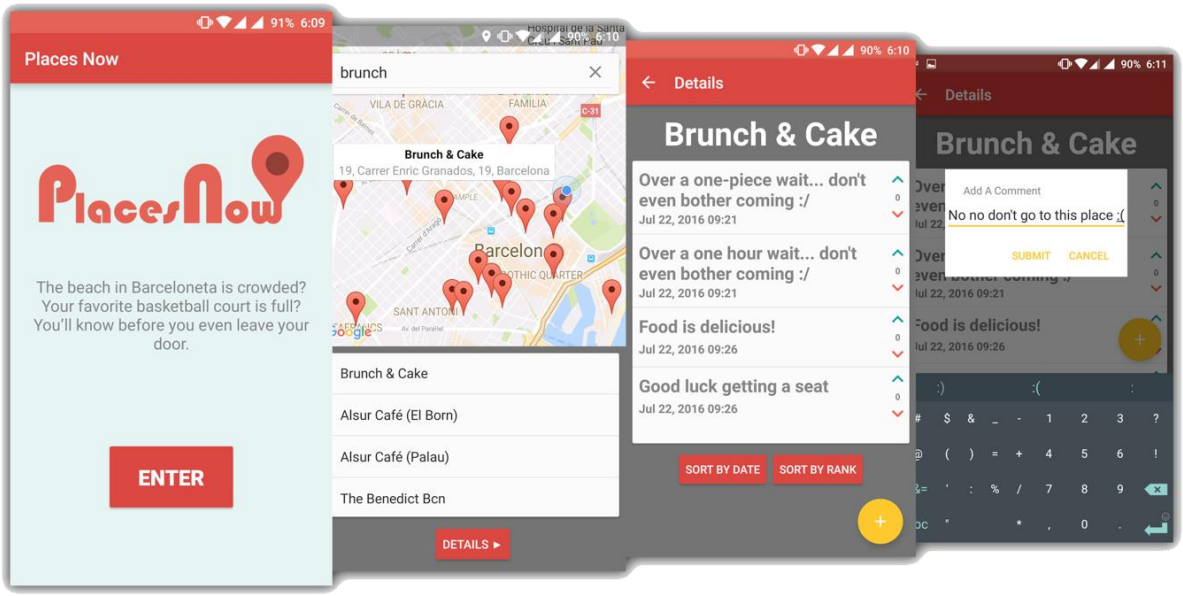
Places Now

Devpost Staff Pick

HackGT@UPC • Jul 2016 (Barcelona Summer Program)

The beach in Barcelona is crowded? That restaurant has a 1-hour wait? You'll know so much about everything before you even leave your door.

This project is an exploration at the way people use maps. Walking around Barcelona with Google Maps, we sometimes tend to get inaccurate or not up-to-date information about particular places. We would like a better and more personal experience by bringing more **relevant**, **real-time** and **reliable** *crowdsource* information to the table. With our Android Application, people can have a better idea of whether a popular tourist attraction have been closed off due to renovation, or if there is a huge line for the tickets right now. They may also get more accurate information on whether a certain shop has a discount sale happening at the moment. Gone will be the days where travelers rely on tedious research beforehand to get local and up-to-date information about new places.



A very simple navigation flow combined Google Maps with real-time crowdsourced feeds. I laid out the Android application design frameworks and set up the Google Maps interface allowing for easy searching of places of interest around the user's location. I also worked on connecting to the Firebase backend to both store and retrieve user feeds based on a given location. Together with 4 other teammates and about 12 hours of efforts, we were thrilled that our prototype gets Staff picked by Devpost and featured on their front page. We believe that our project has potential to keep active development after the Hackathon.

http://devpost.com/software/places-now-3vxy4r

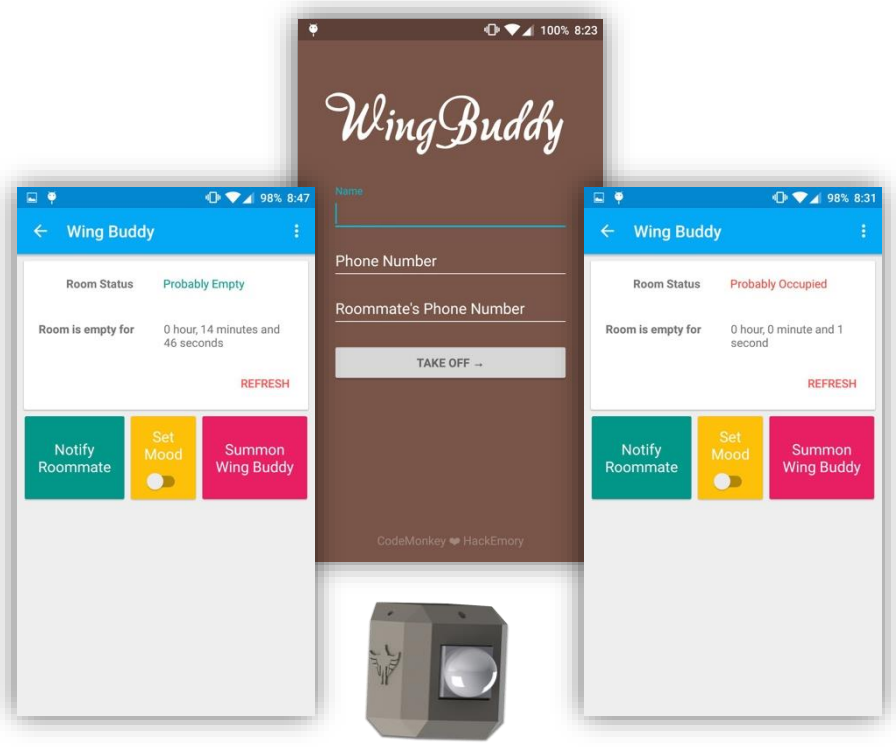
Wing Buddy

First Prize

HackEmory • Apr 2016

No more awkward moments.

It is late at night, you are at a party. Everything is perfect: the people, the music, and the atmosphere. You dance and flow through the crowd. Eventually, you meet someone special and show her your best moves. She likes you and joins you. You guys have lots of fun and decide to go back to your place. But there is a problem, you are a college student, which means that you are living with a roommate – going to back to your place seemed like a great idea until you remembered that your roommate is quite unpredictable and you never know whether your room is available. Thanks to WingBuddy, we come to your rescue.



WingBuddy is a platform that is spread across multiple devices, ranging from microprocessors with IoT cores to mobile devices. We have a sensor that detects motion in the room, which communicates with the app and tells you whether your room is empty or not. The app can notify your roommate instantly with a press of a single button of your special guest, setting the mood right by playing some music through connected Bluetooth speakers, and also summon your WingBuddy, if you need help with anything, collecting points as you help others and be a good WingBuddy.

I focused on creating the front end app interface to make it elegant and easy to use. I also interfaced the app to communicate with Firebase server as well as linking it with the motion sensor through network. This project was made possible with 2 other teammates in 12 hours.

http://devpost.com/software/wingbuddy

TheBot

First Prize

CodeB with Bloomberg @ Georgia Tech • Feb 2016

Stock trading algorithm with the best returns

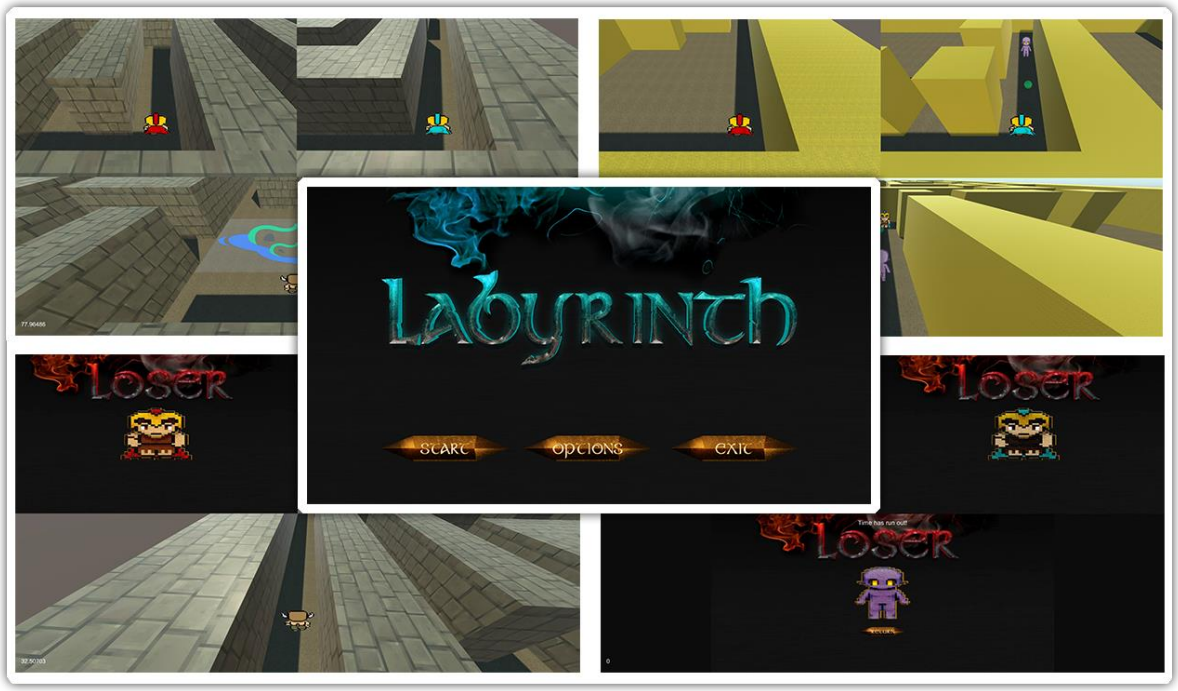
This is my first venture into finance, the goal was to create an algorithm to earn the highest amount of money in a simulated stock market environment. Our team took a different approach from the rest at the start. Through the practice sessions we realized that the best way to grow our portfolio for this competition is to rely on earnings from dividends. We calculated the P/E ratios as well as taking cues from the volume of trades for particular stocks and manage to get a formula to determine the most lucrative stock to buy at any one time. Throughout the practice sessions we also realized that some stock tends to rise in value consistently, thus buying them at the end makes for an attractive strategy. During the actual competition of 20 min stock simulation, we simply waited for 15 min, until the value of a particular stock gets huge, then we finally get in the game, buying all at one shot and getting the best valued dividends. The teams who started trading at the 0th minute had all ran out of money to buy any more stocks, as their returns trickled down and their portfolio growth stagnated. With this strategy we are able to stay ahead of the competition by a big margin and eventually win the hackathon. It has been a very fun learning experience, both trying to reason stock trading and handling java and python web requests to interface with the actual trading platform.

Labyrinth

Top 10 Finalist

SwampHacks • Jan 2016

A simple yet addictive game created from a rare blend of Photoshop, Unity and brains.



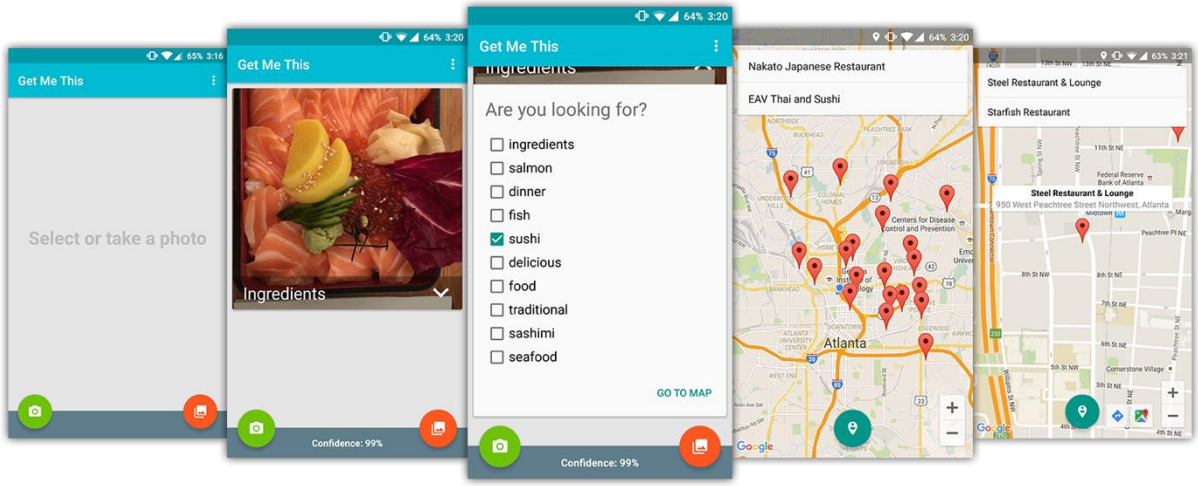
A probing venture into Unity turned into a viable idea for a 2.5 dimensional 3-player maze survival game at SwampHacks, I started off with designing most of the game's visuals, including all the menus, the player sprite image and the texture maps for the actual maze. With the completion of the basic game world, I laid the schematics of the actual maze onto each game mode. Using Unity, I linked the different menu controls to the actual game, merging everything into the final product – a highly addictive adventure where players control either a monster or a human fighting each other before time runs out. This project was created with 4 other team members in 36 hours.

http://devpost.com/software/labyrinth-dsp56c

Get Me This

UGAHacks • Oct 2015

Android app that recognizes the things you don't and tells you where to get it.



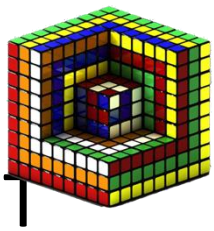
This app comes in handy when you travel to a foreign country and want to get something but don't know how to call it. Simply by taking a photo of this app will identify it and direct you to nearby shops to get it. I designed and made the front-end, as well as using Clarifai API to recognize the images, then connect the query to Google Maps to discover places. This app was made with 3 other teammates and finished within 36 hours.

http://devpost.com/software/get-me-this

Cube 2 x 2 Solver

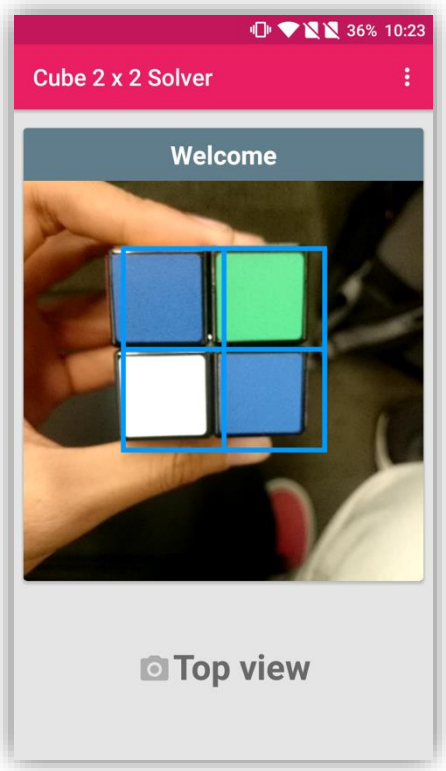
Grand Prize Winner

Georgia Tech Appathon • Oct 2015



Simple app to let user take photos of the faces of a 2 by 2 Rubik's Cube and generate the required steps to solve it.

his is my first time developing an Android app, I created the front-end interface, then used code to acquire the images of the Rubik's cube. I also generated my own color detection algorithm to translate the images into the corresponding set of colors representing each face of the Rubik's cube. It was a very fun and fulfilling experience coding the entire app in less than 12 hours. I worked with 2 other teammates over the project.



https://github.com/jiangshen/Rubik-sCube2x2Solver